

### Claims

1. A system for measuring noise within a designated frequency band of an applied signal, comprising:

a frequency converter frequency translating the applied signal by a set of equally spaced frequencies to provide a corresponding set of intermediate frequency signals;

a sampler measuring the noise in at least two measurement bands of each of the intermediate frequency signals that are separated by the frequency spacing of the equally spaced frequencies; and

a signal processor determining the noise power in the frequency band of the applied signal based on the noise measured by the sampler.

2. The system of claim 1 wherein the frequency converter includes a preselector limiting the bandwidth of the applied signal, a mixer having a first port coupled to the preselector, a cascaded high pass filter and a low pass filter interposed between a second port of the mixer and the sampler, wherein a third port of the mixer receives a local oscillator signal having at successive times the frequencies in the set of equally spaced frequencies.

3. The system of claim 1 wherein measuring the noise in the at least two measurement bands of each of the intermediate frequency signals that are separated by the frequency spacing of the equally spaced frequencies includes sampling each of the intermediate frequency signals.

4. The system of claim 3 wherein the at least two measurement bands are defined by filtering each of the intermediate frequency signals prior to sampling each of the intermediate frequency signals.

5           5. The system of claim 3 wherein the at least two measurement bands of each of the intermediate frequency signals are defined by sampling each of the intermediate frequency signals and digitally filtering samples acquired from the sampling.

6. The system of claim 1 wherein the signal processor determines the noise power  
10 in the frequency band of the applied signal by solving a matrix equation resulting from the noise measured in the at least two measurement bands of each of the intermediate frequency signals by the sampler, and applying the least squares method.

7. The system of claim 1 wherein the at least two measurement bands of each of  
15 the intermediate frequency signals include an upper sideband and a lower sideband that are overlapping.

8. The system of claim 1 wherein frequency translating the applied signal by the set of equally spaced frequencies to provide the corresponding set of intermediate  
20 frequency signals includes mixing the applied signal with a local oscillator signal having at successive times the frequencies in the set of equally spaced frequencies.

9. The system of claim 3 wherein the at least two measurement bands of each of the intermediate frequency signals include an upper sideband and a lower sideband that are overlapping.

5           10. A method for measuring noise within a frequency band of an applied signal, comprising:

          (a) frequency translating the applied signal by a set of equally spaced frequencies to form a corresponding set of intermediate frequency signals;

          (b) measuring the noise in at least two measurement bands of each of the  
10 intermediate frequency signals that are separated by the frequency spacing of the equally spaced frequencies; and

          (c) determining the noise power in the frequency band of the applied signal based on the noise measured in (b).

15           11. The method of claim 10 wherein (a) includes mixing the applied signal with a local oscillator signal having at successive times the frequencies in the set of equally spaced frequencies.

          12. The method of claim 10 wherein (b) includes sampling each of the  
20 intermediate frequency signals.

          13. The method of claim 11 wherein (b) includes sampling each of the intermediate frequency signals.

14. The method of claim 12 wherein the at least two measurement bands are defined by filtering each of the intermediate frequency signals prior to sampling each of the intermediate frequency signals.

5           15. The method of claim 13 wherein the at least two measurement bands are defined by filtering each of the intermediate frequency signals prior to sampling each of the intermediate frequency signals.

10           16. The method of claim 10 wherein the at least two measurement bands are defined by sampling each of the intermediate frequency signals and digitally filtering samples acquired from the sampling.

15           17. The method of claim 10 wherein the at least two measurement bands of each of the intermediate frequency signals are defined by filtering the intermediate frequency signals in the set.

18. The method of claim 10 wherein (c) includes solving a matrix equation resulting from the noise measurements in (b) and applying the least squares method.

20           19. The method of claim 11 wherein (c) includes solving a matrix equation resulting from the noise measurements in (b) and applying the least squares method.

20. The method of claim 10 wherein the at least two measurement bands in each of the intermediate frequency signals each include an upper sideband and a lower sideband that are overlapping.

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